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REVIEW OF THE GENUS *LEPTONYCTERIS*
(MAMMALIA: CHIROPTERA)

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On 29 November 1959, Carter captured a series of large *Leptonycteris* at Tepoztlán, Morelos, México. These specimens are referable to the population described by Stains (Univ. Kans. Publ., Mus. Nat. Hist., 9 (10): 353-356, 1957) as *Leptonycteris nivalis longala*, but they are from a locality far south of the range ascribed to that race and from an area where a smaller *Leptonycteris* had been previously collected. This anomaly has led us to review the systematic status of representatives of this genus. Previously, all Mexican *Leptonycteris* have been assigned to a single species, *L. nivalis*, but actually two distinct populations occur there. One is characterized by: (1) fur short and dense (that on the back about 4 to 5 mm long); (2) forearm, 52-56 mm; (3) terminal phalanx of third digit, 10-12 mm; (4) total length of third finger averaging 97 mm (92-101); (5) uropatagium nearly 6 mm wide at the midline, scantily haired, and with no distinct fringe of hairs. The second is larger, and is characterized by: (1) fur long and fluffy (that on back about 7 to 8 mm long); (2) forearm, 55-60 mm; (3) terminal phalanx of third finger, 16-19 mm; (4) total length of third finger averaging 110 mm (108-112); (5) uropatagium 4 mm or less in width at the midline, more heavily haired, and with a conspicuous fringe of hairs 3 to 4 mm long.

The problem of assigning Saussure's name *nivalis* to one of these populations is complicated by the fact that the type specimen apparently has been lost. Reference to the original description and plate (Rev. et Mag. Zool. Paris, ser. 2, 12: 492-493, 1860), however, reveals that Saussure had a specimen

of the long-haired form because he gives the length of the forearm as 60 mm. This measurement is well above the maximum for the short-haired bats and at the maximum for the long-haired ones. Also, he gives the width of the uropatagium as 4 mm at the midline, a measurement that also agrees with that for the long-haired bats. From the drawing, Plate 20, which Saussure indicates is natural size, one can determine the length of the third metacarpal and of each phalanx of the third digit. These, in sequence, are 51.3, 17, 25, and 16.7; total length of third finger, 110. These measurements, too, are above the maxima for the short-haired bats. Consequently, all available evidence indicates that Saussure applied the name *nivalis* to the larger, long-haired *Leptonycteris*.

Two other names have been applied to this large, long-haired *Leptonycteris*; namely, *Leptonycteris nivalis yerbabuena* Martinez and Villa (An. Inst. Biol. Mex., 11 (1): 291-361, 1940), type locality, Yerbabuena, Guerrero, and *Leptonycteris nivalis longala* Stains (*supra cit.*), type locality, ca. Arteaga, Coahuila. Although the entire series on which the name *yerbabuena* was based has been destroyed, the measurements recorded on length of the third finger and length of the terminal phalanx of that finger fall within the ranges of variation of those measurements in the long-haired population and are above the maxima for the short-haired bats. Stains' name *longala* without question applies to the long-haired group. It becomes necessary, therefore, to submerge *L. n. longala* Stains and *L. n. yerbabuena* Martinez and Villa as synonyms of *Leptonycteris nivalis* Saussure on the basis of priority.

In his review of the genus *Leptonycteris*, Hoffmeister (J. Mamm., 38 (4): 454-461, 1957) placed *L. curasoae* Miller of the Netherlands Antilles as a subspecies of *L. nivalis* (Saussure) and he described as new the short-haired, short-winged Mexican population, giving it the name *Leptonycteris nivalis sanborni*. Our study leads us to the conclusion that these three populations are specifically, rather than subspecifically, distinct. The Mexican short-haired *Leptonycteris* resembles the West Indian *Leptonycteris curasoae* Miller (Proc. Biol. Soc. Wash., 13: 126-127, 1900) in that the uropatagium is sparsely

TABLE 1.—Comparative measurements (in mm) of three species of *Leptonysteris*

MEASUREMENT OF	<i>L. nivalis</i>		<i>L. samborini</i>		<i>L. curusoue</i>
	7 ♀♀	3 ♂♂	5 ♀♀	5 ♀♀	4 ♂♂, 2 ♀♀ (pooled)
Forearm	56.6 (54.5-58.2)	57.6 (55.4-59.5)	54.7 (53.9-55.0)	53.5 (51.7-55.6)	54.7 (54.0-55.3)
3rd Metacarpal	50.3 (49.0-51.5)	50.1 (49.0-51.7)	48.8 (47.6-49.5)	47.3 (45.6-48.5)	48.6 (48.0-49.4)
1st Phalanx III	16.0 (15.5-16.4)	15.8 (14.7-16.6)	14.3 (13.4-14.8)	14.1 (13.0-14.8)	14.7 (14.2-15.5)
2nd Phalanx III	26.1 (25.4-26.5)	26.9 (25.4-28.3)	23.9 (22.9-25.0)	23.0 (21.5-24.8)	23.5 (22.8-23.8)
3rd Phalanx III	17.9 (17.0-18.3)	17.6 (16.2-18.7)	11.5 (10.6-12.3)	11.3 (9.8-12.4)	12.1 (10.5-12.8)
3rd Finger	110.0 (108.4-112.3)	110.4 (107.1-115.3)	98.5 (95.1-101.2)	95.6 (92.1-100.3)	99.1 (97.8-99.9)
Condylbasal length	27.2 (26.2-28.3)	27.1 (26.5-28.0)	26.0 (25.7-26.5)	25.7 (25.5-26.1)	27.4 (27.0-28.0)
Zygomatic breadth	11.3 (10.9-11.6)	11.4 (10.7-12.0)	10.8 (10.1-11.3)	10.9 (10.8-11.0)	11.4 (11.1-11.8)
Interorbital width	5.1 (4.3-5.4)	5.3 (5.3-5.4)	4.6 (4.4-4.7)	4.6 (4.3-4.8)	5.1 (5.0-5.4)
Mastoidal breadth	11.8 (11.5-12.0)	12.0 (11.5-12.5)	10.9 (10.7-11.1)	10.8 (10.7-10.9)	11.0 (10.6-11.5)
Length of palate, from alveolus	14.5 (13.3-15.3)	14.5 (14.0-15.0)	14.3 (13.9-14.7)	14.2 (14.0-14.5)	15.3 (15.2-15.6)
Maxillary tooththrow	9.2 (8.5-9.5)	9.2 (8.9-9.6)	8.9 (8.7-9.2)	8.6 (8.5-8.8)	9.6 (9.5-9.7)
Length of mandible	19.1 (18.2-20.3)	19.2 (18.5-19.7)	18.7 (18.1-19.0)	18.5 (18.0-18.8)	19.3 (19.2-19.7)

haired, the body fur is short, dense, and velvety, and the third finger is short (less than 100 mm). That the two are not conspecific, however, is suggested by two noticeable differences in the skull and the dentition. Reference to Table 1 reveals that the skull of *curasoae* is large like that of *nivalis*. In fact, in six of the seven cranial measurements recorded, the minimum of *curasoae* exceeds the maximum found in the Mexican short-haired population here referred to *L. sanborni*. In addition, the upper incisors of *curasoae* are evenly spaced, not in two pairs separated by a broad median gap, and the individual teeth are larger. The first upper molar of *curasoae* measures from 2.1 to 2.3 mm (avg. 2.2) in crown length as opposed to 1.7 to 2.0 mm in *sanborni*. The crescentic condition of the second lower premolar (actually the first in the series of three) is not of any taxonomic importance, as was pointed out by Hoffmeister (*op. cit.*), because it occurs in all three populations studied.

In summary, we recognize the following three species of *Leptonycteris* in our samples:

1. *Leptonycteris nivalis* (Saussure)

Synonyms: *L. n. longala* Stains

L. n. yerbabuena Martinez and Villa

Diagnosis: Fur long, lax; uropatagium moderately hairy and with a conspicuous fringe of hairs 3 to 4 mm long; forearm, 55–60 mm (avg. 57); length of third finger, 107–115 mm (avg. 110); length of terminal phalanx of third finger, 16–19 mm (avg. 17.7); upper incisors in two pairs with median gap; depth of mandible behind last molar, 2.0–2.5 mm, deeper in males than in females.

Range: From Arizona south to Oaxaca; east to Hidalgo and Veracruz.

2. *Leptonycteris curasoae* Miller

Diagnosis: Fur short and dense; uropatagium sparsely haired and with a slight fringe; forearm, 54–55 mm (avg. 54.7); length of third finger, 97.8–99.9 mm (avg. 99.1); length of terminal phalanx of third finger, 10.5–12.8 mm (avg. 12.1); upper incisors rather large and evenly spaced; depth of mandible behind last molar, 2.0–2.6 mm, deeper in males than in females.

Range: Netherlands West Indies.

3. *Leptonycteris sanborni* Hoffmeister

Diagnosis: Fur short and dense; uropatagium nearly naked; forearm, 51.7–55.6 mm (avg. 54.1); length of third finger, 92.1–101.2 mm (avg.

97.5); length of terminal phalanx of third finger, 9.8–12.4 mm (avg. 11.4); upper incisors small and in two pairs separated by a median gap; depth of lower mandible behind last molar, 1.5–1.7 mm, deeper in males than in females.

Range: Texas and Coahuila; south in winter to Morelos and Veracruz.

L. curasoe differs further from both *nivalis* and *sanborni* in having heavier dentition, especially noticeable when comparing the inner upper incisors and the first upper molars.

Specimens examined: *L. sanborni*—OAXACA: 6 mi NW Mixteguilla, 15 (TCWC); $\frac{3}{4}$ mi W San Sebastian (= Los Fustes), 2 (TCWC); Cuicatlán, 1 (KU); 3 km WNW Domingullo, 730 m, 2 (KU); 3 mi W Mitla, 1 (KU). GUERRERO: El Papayo, 25 ft, 1 (TCWC); Tres Palos, 10 ft, 1 (TCWC); 1 mi S Palo Blanco, 3,000 ft, 3 (TCWC); 4 mi E Colotlipa, 3,200 ft, 1 (TCWC). MORELOS: *ca.* Huajintlán, 3,410 ft, 2 (1, UI; 1, TCWC). PUEBLA: 1 mi E Raboso, 4,350 ft, 1 (KU). VERACRUZ: 3 km W Boca del Rio, 5 (KU). MÉXICO, D. F.: 2.8 mi NNW Milpa Alta, 2,620 m, 16 (KU). HIDALGO: 6 km NW Tasquillo, 5,000 ft, 1 (KU). MICHOACÁN: 12 mi S Tzitzio, 1,050 m, 61 (UM). JALISCO: 5 mi W Chapala, 51 (KU); 8 mi NE Ocotlán, 1 (KU); Hacienda San Martín, 5,000 ft, 18 mi W Chalapa, 3 (KU); 5 mi SW Cojumatlán, 5,600 ft, 5 (TCWC). SINALOA: 1 mi N, $\frac{1}{2}$ mi E San Miguel, 1 (KU); Eldorado, 8 (KU). SONORA: $\frac{1}{4}$ mi W Aduana, 1,600 ft, 4 (KU); 25 mi N Hermosillo, 1,500 ft, 1 (TCWC); Santa Maria Mine, El Tigre Mts, 3 (UM). CHIHUAHUA: Carimechi, Río Mayo, 5 (2 skins only) (UM). ARIZONA: 27–28 mi SW Casa Grande, Pinal Co., 14 (UI); Colossal Cave, Pima Co., 2 (UI); Miller Canyon, 10–15 mi SE Ft. Huachuca, Cochise Co., 55 (UI); 8 mi W Ft. Huachuca, Cochise Co., 1 (UI); 5 mi E Patagonia, Santa Cruz Co., 5 (UI).

L. nivalis—TEXAS: Chisos Mts., Brewster Co., 20 (TCWC). COAHUILA: 12 mi S, 2 mi E Arteaga, 7,500 ft, 21 (KU). MORELOS: Tepoztlán, 6 (UM); 3 mi E Tepoztlán, *ca.* 6,000 ft, 17 (TCWC).

L. curasoe—NETHERLANDS WEST INDIES: Quaridikiri Cave, Aruba, 6 (AMNH); Willemstad, Curaçao, 2 (USNM).

Examination of the above records reveals that *L. sanborni* is the most abundant and widespread *Leptonycteris* in México. *L. nivalis* appears to be a rarer species whose range overlaps that of *sanborni*, at least in winter, in southern México. Known dates of capture of *nivalis* in southern México (Guerrero, Morelos) are from November to February; the only known summer records are from Texas and Coahuila. *L. sanborni*, on the other hand, is present at all seasons in southern México.

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